

## CLAIMS

What is claimed is:

- 1           1. A method for forming a via in an integrated circuit packaging substrate  
2 comprising:  
3           making a via opening having a base, the base of the via opening positioned  
4 at a selected level that includes conductive material within the integrated circuit  
5 packaging substrate;  
6           depositing an interfacial layer material within at the base of opening;  
7           placing a conductive material over the interfacial material; and  
8           heating the materials at the base of the opening.
- 1           2. The method for forming a via of claim 1 further comprising masking the  
2 surface of the integrated circuit packaging substrate, a mask being formed having a  
3 mask opening therein positioned above to the base of the via opening.
- 1           3. The method for forming a via of claim 3 wherein depositing an interfacial  
2 layer material within the via opening includes sputtering the interfacial material  
3 onto the mask and into the via opening; and  
4           wherein the method further comprises removing the mask.
- 1           4. The method for forming a via of claim 1 wherein interfacial layer  
2 material is a material that will diffuse into the conductive material at the  
3 temperature produced by heating the materials at the base of the via opening.
- 1           5. The method for forming a via of claim 1 wherein the interfacial material  
2 is selected from the group consisting of palladium, platinum, cobalt or nickel.
- 1           6. The method for forming a via of claim 1 wherein the interfacial material  
2 includes palladium.

1           7. The method for forming a via of claim 1 wherein heating materials at the  
2 base of the via opening includes directing energy from a laser at the base of the  
3 opening.

1           8. The method for forming a via of claim 7 wherein the laser energy is  
2 higher at the center of the laser.

1           9. The method for forming a via of claim 7 wherein the laser produces  
2 temperatures at the base of the via opening in the range of 400 to 600 degrees C.

1           10. The method for forming a via of claim 7 wherein the laser has a  
2 diameter of approximately half the diameter of the base of the via opening.

1           11. The method for forming a via of claim 1 wherein placing a conductive  
2 material over the interfacial material includes plating copper within the via opening.

1           12. The method for forming a via of claim 1 wherein placing a conductive  
2 material over the interfacial material further comprises:  
3           plating electroless copper at the base of the via opening; and  
4           plating the via opening with electrolytic copper.

1           13. The method for forming a via of claim 1 further comprising capping the  
2 via.

1           14. An integrated circuit packaging substrate comprising:  
2           a first layer of conductive material;  
3           a second layer of conductive material; and  
4           a via for interconnecting the first layer of conductive material and the second  
5 layer of conductive material, the via further comprising a base positioned at one of  
6 the first layer and the second layer, the base including a conductive material and an  
7 interfacial adhesion material.

1           15. The integrated circuit packaging substrate of claim 14 wherein the  
2     interfacial adhesion material forms a solid solution with the conductive material.

1           16. The integrated circuit packaging substrate of claim 14 wherein the  
2     interfacial adhesion material is palladium and the conductive material is copper,  
3     wherein the palladium forms a solid solution with the copper.

1           17. The integrated circuit packaging substrate of claim 14 wherein the  
2     interfacial adhesion material interdiffuses with the conductive material.

1           18. The integrated circuit packaging substrate of claim 17 wherein the  
2     interdiffusion of the interfacial adhesion material and the conductive material is  
3     nonuniform.

1           19. The integrated circuit packaging substrate of claim 17 wherein the  
2     interdiffusion of the interfacial adhesion material and the conductive material forms  
3     a plurality of teeth-like structures that extend into the conductive material.

1           20. The integrated circuit packaging substrate of claim 14 wherein the  
2     integrated circuit package is a substrate.

1           21. A method for forming a via in an integrated circuit package substrate  
2     comprising:  
3         embedding an interfacial adhesion layer at a base of a via; and  
4         heating at least the interfacial adhesion layer.

1           22. The method of claim 21 wherein embedding the interfacial adhesion  
2     layer further includes placing a conductive material over the interfacial adhesion  
3     layer.

1           23. The method of claim 21 wherein heating the materials at the base of the  
2 via includes directing the energy of a laser at the base of the via.

1           24. The method of claim 21 wherein heating the materials at the base of the  
2 via includes heating the materials at the base of the via to a temperature within the  
3 range of 400-600 degrees C.

1           25. The method of claim 21 wherein the interfacial adhesion material  
2 interdiffuses with the conductive material.

1           26. The method of claim 25 wherein the interdiffusion of the interfacial  
2 adhesion material and the conductive material is nonuniform.

1           27. The method of claim 25 wherein the interdiffusion of the interfacial  
2 adhesion material and the conductive material forms teeth-like structures that extend  
3 into the conductive layers at the base of the via.

1           28. A system comprising;  
2 a device including at least one integrated circuit; and  
3 at least one integrated circuit further including:  
4               a first layer of conductive material;  
5               a second layer of conductive material; and  
6               a via for interconnecting the first layer of conductive material and the  
7 second layer of conductive material, the via further comprising a base positioned at  
8 one of the first layer and the second layer, the base including a conductive material  
9 and an interfacial adhesion material.

1           29. The system of claim 28 wherein the interfacial adhesion material  
2 interdiffuses with the conductive material.

1           30. The system of claim 29 wherein the interdiffusion of the interfacial  
2   adhesion material and the conductive material forms a plurality of teeth-like  
3   structures that extend into the conductive material.